

WHAT IS CLAIMED IS:

1. A composition for forming a coating upon a substrate when applied and cured thereon, said composition comprising:

- (a) an epoxy-functional silane;
- (b) a multipodal silane;
- (c) a strong acid; and
- (d) a solvent.

2. The composition of Claim 1 wherein said solvent is selected from the group consisting of an aqueous solvent, an organic solvent, and a non-polar liquid.

3. The composition of Claim 2 wherein said organic solvent is selected from the group consisting of an alcohol, an ether, a cyclic ether, and a ketone.

4. The composition of Claim 1 wherein said epoxy-functional silane is present in a molar ratio to said multipodal silane that ranges from between 0.05:1 to 10:1.

5. The composition of Claim 4 wherein said molar ratio of said epoxy-functional silane to said multipodal silane is from between 0.3:1 to 0.7:1.

6. The composition of Claim 1 wherein said strong acid is present in a molar ratio to said epoxy-functional silane that ranges from between 0.01:1 to 0.5:1.

7. The composition of Claim 4 wherein said molar ratio of said strong acid to said epoxy-functional silane is from between 0.02:1 to 0.15:1.

8. The composition of Claim 1 wherein said strong acid is selected from the group consisting of phosphoric acid, phosphorous acid, sulfuric acid, sulfurous acid, nitric acid, nitrous acid, and alkyl and aryl sulfonic and di-sulfonic acids.

9. The composition of Claim 1 wherein said composition further comprises a condensation catalyst.

10. The composition of Claim 9 wherein said condensation catalyst is selected from the group consisting of an amine condensation catalyst and an amide condensation catalyst.

11. The composition of Claim 1 wherein said composition further comprises at least one silane additive.

12. The composition of Claim 1 wherein said composition further comprises at least one organic functional additive.

13. The composition of Claim 1 wherein said composition further comprises colloidal silica.

14. The composition of Claim 13 wherein said colloidal silica includes particulate silica having an average diameter no greater than 75 nanometers.

15. The composition of Claim 14 wherein said average diameter of said particulate silica is no greater than 50 nanometers.

16. The composition of Claim 1 wherein said composition further comprises a metal oxide composite colloid material.

17. The composition of Claim 1 wherein said composition further comprises at least one surfactant.

18. The composition of Claim 1 wherein said composition further comprises a photoinitiator.

19. A method of forming a coating upon a substrate, said method comprising the steps:

(a) providing a coating composition, said composition comprising an epoxy-functional silane, a multipodal silane, a strong acid, and a solvent;

(b) applying said composition in step (a) to said substrate; and

(c) curing said composition applied to said substrate in step (b).

20. The method of Claim 19 wherein in step (a), said composition further comprises a silane additive.

21. The method of claim 20 wherein said silane additive comprises an organic polymerizable functional group.

22. The method of Claim 21 wherein following application of the coating in step (b) and prior to curing said coating in step (c), said method comprises the step:

(a) polymerizing the organic portion of said coating composition.

23. The method of Claim 19 wherein in step (a), said composition further comprises an organic additive.

24. The method of claim 23 wherein said organic additive contains a polymerizable functional group.

25. The method of Claim 24 wherein following application of the coating in step (b) and prior to curing said coating in step (c), said method comprises the step:

- (a) polymerizing the organic portion of said coating composition.
- 26. The method of Claim 19 wherein in step (a), said composition further comprises a photoinitiator additive.
- 27. The method of Claim 26 wherein following application of the coating in step (b) and prior to curing said coating in step (c), said method comprises the step:
 - (a) polymerizing the organic portion of said coating composition.
- 28. The method of Claim 19 wherein in step (b), said substrate comprises a lens surface.
- 29. The method of Claim 19 wherein prior to step (b), a primer is applied to said substrate.
- 30. The method of Claim 19 wherein in step (b), said composition is applied via a procedure selected from the group consisting of dip, spin, flow, spray, and roll coating.
- 31. The method of Claim 19 wherein in step (c), such composition is cured by a curing technique selected from the group consisting of thermal curing, UV curing, and electron beam curing.
- 32. An article of manufacture having at least one surface defining a substrate, said substrate having formed thereon a coating formed by a coating composition, said composition comprising an epoxy-functional silane, a multipodal silane, a strong acid, and a solvent.
- 33. The article of manufacture of Claim 32 wherein said substrate defining said surface is fabricated from a material selected from the group consisting of metal, glass and plastic.
- 34. The article of manufacture of Claim 33 wherein said article of manufacture comprises a lens.